8-28-00

A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Lester B. Shupe, David R. Clark

Group Art Unit: N/A

Examiner: NOT ASSIGNED

Serial No.: N/A

Filed: N/A

For: METHOD AND SYSTEM FOR AUTOMATICALLY UPDATING A SERVING MSC WITH A CHANGE IN A SUBSCRIBER PROFILE

Attorney Docket No.: USW1720 PUS

TRANSMITTAL LETTER

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Enclosed with reference to the above matter are the following documents:

1. Assignment

The Commissioner is hereby authorized to charge any additional fees to US West Deposit Account No. 21-0456. A duplicate of this Transmittal Letter is enclosed for that purpose.

Respectfully submitted,

Donald L. Brodigan

By: _____

Paul M. Schwartz
Reg. No. 33,278
Attorney/Agent for Applicant

Date: 8-25-00

SCHWARTZ & SCHWARTZ, P.L.C.
29623 Northwestern Highway, Suite 200
Southfield, MI 48034
Phone: 248-386-7200
Fax: 248-386-7225

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8

I hereby certify that this paper, including all enclosures referred to herein, is being deposited with the United States Postal Service as first-class mail, postage pre-paid, in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on:

8-25-00 — **Date of Deposit**

Paul M. Schwartz — **Name of Person Signing**

_____ — **Signature**

UTILITY PATENT APPLICATION TRANSMITTAL

22193

PATENT TRADEMARK OFFICE

Address to:	Attorney Docket No.	1720/USW1720PUS
Box PATENT APPLICATION **Assistant Commissioner for Patents** **Washington, DC 20231**	*Inventor(s) or Application Identifier:* Lester B. Shupe, David R. Clark	

jc886 U.S. PTO 09/648908 08/25/00

1. This application entitled METHOD AND SYSTEM FOR AUTOMATICALLY UPDATING A SERVING MSC WITH A CHANGE IN A SUBSCRIBER PROFILE is:

   a. x A new application under 37 C.F.R. §1.53(b).

   b. __ A __ continuation __ divisional or __ continuation-in-part application under 37 C.F.R. § 1.53(b) of prior application Serial No. _____ filed on _____, entitled _____.

Application elements and other attached papers:

2. x Specification (incl. Claims and Abstract) [Total Pages 10]

3. x Drawings (_ informal x formal) [Total Sheets 4]

4. x Oath or Declaration

   a. x Newly-executed

   b. __ Copy from a prior application (37 C.F.R. § 1.63(d))

5. __ Incorporation By Reference: The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Item 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. __ This application is filed by fewer than all the inventors named in the prior application, 37 C.F.R. § 1.53(d)(4).

   a. __ ***DELETE*** the following inventor(s) named in the prior nonprovisional application:

   _____

   _____

   b. __ The inventor(s) to be deleted are set forth on a separate sheet attached hereto.

CERTIFICATION UNDER 37 C.F.R. § 1.10

I hereby certify that this UTILITY PATENT APPLICATION TRANSMITTAL and the documents referred to as attached therein are being deposited on the below date with the United States Postal Service in an envelope as "Express Mail Post Office to Addressee" addressed to: Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

Express Mail Label No. EK 758486347 US

Date of Deposit: August 25, 2000

Kaye R. Miller
(Type or print name of person mailing paper)

Kaye R. Miller
(Signature of person mailing paper)

7. Preliminary Amendment:

a. _ A Preliminary Amendment is attached.

b. _ Cancel in this application original claims _____ of the prior application before calculating the filing fee.

c. _ Please amend the specification by inserting before the first line the sentence:

"This is a

_ continuation

_ divisional

of copending application(s)

_ Serial number __ /_____ filed on _____."

d. _ A Petition to Suspend Prosecution For The Time Necessary to File An Amendment (New Application Filed Concurrently) is attached.

8. Small entity status:

a. _ A small entity statement is attached.

b. _ A small entity statement was filed in the prior nonprovisional application and such status is still proper and desired.

c. _ Is no longer desired.

9. Fee Calculation:

FOR	NUMBER FILED	NUMBER EXTRA	RATE	CALCULATIONS
TOTAL CLAIMS (37 C F.R. § 1.16(c))	10 -20 =	--	X 18.00	--
INDEPENDENT CLAIMS (37 C.F.R. § 1.16(b))	3 -3 =	--	X 78.00	--
MULTIPLE DEPENDENT CLAIMS (if applicable) (37 C.F.R. §1.16(d))			260.00	--
			BASIC FEE (37 C.F.R. § 1.16(a))	760.00
		Total of above Calculations =		690.00
Reduction by 50% for filing by small entity (Note 37 C.F.R. §§ 1.9, 1.27, 1.28)				--
		Assignment Recordal Fee	40.00	40.00
			TOTAL =	730.00

10. _ A check in the amount of $_____ is enclosed.

11. x The Commissioner is hereby authorized to credit overpayments or charge the following fees (or any deficiency therein) to Qwest Deposit Account No. 21-0456 :

a. x Fees required under 37 C.F.R. § 1.16.

b. x Fees required under 37 C.F.R. § 1.17.

12. Maintenance of Copendency of Prior Application

__ A request for extension of time and the appropriate fee have been filed in the pending **prior** application (or are being filed in the prior application concurrently herewith) to extend the period for response until _____.

13. __ An Information Disclosure Statement (IDS) is attached, along with the following indicated attachments thereto:

a. __ Form PTO/SB/08A (_1_____ sheet(s))

b. __ Copies of references cited

14. __ Certified copy of priority document(s)

15. x Return Receipt Postcard

16. __ Other: _____

17. x An Assignment of the invention to Qwest Communications International Inc.

a. x is attached.

b. __ was recorded on _____ at Reel ___, Frame ____.

18. The power of attorney in the prior application is to:

_____

Name of Attorney of Record Reg. No.

__ The power appears in the original papers in the prior application.

__ The power does not appear in the original papers, but was filed on _____.

__ A new power has been executed and is attached.

19. Correspondence Address: Please address all future communications to:

Peter J. Kinsella _____,

22193

PATENT TRADEMARK OFFICE

Telephone: 877-879-4747 or 303-672-2700; Fax: 303-308-9456

Respectfully submitted,

Date 8-25-00

Name: Paul M. Schwartz
Registration No.: 33,278

x Attorney or agent of record
_ Filed under Rule 34(a)

METHOD AND SYSTEM FOR AUTOMATICALLY UPDATING A SERVING MSC WITH A CHANGE IN A SUBSCRIBER PROFILE

TECHNICAL FIELD

This invention relates to a method and system for automatically updating a serving Mobile Switching Center (MSC) when a change has been made by a customer support center to a subscriber's Profile such as a call feature set.

BACKGROUND ART

A prior art wireless communication system is shown in Fig.1 and designated generally by reference 10. Wireless network 10 includes a Central Office Switch (COS) 12 which, in an Advanced Intelligent Network (AIN), may comprise a Service Switching Point (SSP). COS 12 is provided in communication with the Public Switched Telephone Network (PSTN) 14 and one or more subscribers, each having at least one Customer Premises Equipment (CPE) device 16 such as a telephone. COS 12 is further provided in communication with a Mobile Switching Center (MSC) 20. MSC 20 is, in turn, provided in communication with an Intelligent Peripheral (IP) 22, a Home Location Register (HLR) 24 and one or more Base Station Controllers (BSCs) 26. Each BSC 26 is provided in communication with one or more Base Stations (BSs) 28. Finally, each BS 28 is provided in communication with one or more mobile handsets 30, each having an assigned calling number known as a Mobile Directory Number (MDN) or Mobile Identification Number (MIN). Each handset is also assigned an Electronic Serial Number (ESN).

In an Advanced Intelligent Network, COS 12 may comprise an SSP which is generally a node, usually the Subscriber's Local Switch /Central Office Switch or an access tandem (Long-Distance) switching office which recognizes the triggers generated when a subscriber's service invokes an Intelligent Network Trigger and then communicates an SCP to operate the service. As those skilled in the art will recognize, an SCP is a node which contains the service logic and associated data support including configuration and call completion database to execute the required

customer services. An SSP is generally provided in communication with one or more Signal Transfer Points (STPs) which are packet switches used to route signaling messages within the network. In limited traffic situations, Service Switching and Control Points (SSCPs) may also be provided for combining the functions of the SCP and SSP respectively.

The above components comprise the common channel signaling system No. 7 (CCSS7) which is an end-to-end signaling system designed for use primarily in high speed digital networks such as an Advanced Intelligent Network. The CCSS7 is capable of accommodating low-speed analog facilities as well. It typically operates at 64Kbps and can support variable message lengths up to approximately 2,176 bits (272 octets) of information per message. New network services are typically installed on at least two SCP platforms for directly servicing a selected market. The CSS7 Network extends management and control to remote SCPs /adjuncts.

Still referring to Figure l, in operation, a call to a mobile subscriber having handset 30 and a preassigned Mobile Identification Number (MIN), and Electronic Serial Number (ESN), is forwarded through the Public Switched Telephone Network (PSTN) 14 to COS 12. The COS performs a database lookup and identifies the called party directory number as a MIN which corresponds to a specific mobile subscriber and handset 30. COS 12 then forwards the call to the subscriber's home MSC 20.

As recognized, in the example given, the subscriber's home MSC and serving MSC are the same. However, in operation, it is anticipated that the subscriber's serving MSC may be a different MSC such as, for example, when the subscriber is out of her home coverage area and "roaming" on another wireless network. The serving MSC, here MSC 20, will thereafter launch a query to HLR 24 requesting the location of handset 30, as well as call termination parameters including the subscriber's profile or call feature set. MSC will also request a Temporary Location Number (TLN) assigned to subscriber 30 if the subscriber is currently roaming on another network. This request, termed a Location Request Message (LOCREQ) typically includes information such as Calling Party Identification, (the calling party

directory numbers) Called Party Identification (the subscriber's MIN and TCN) and Redirecting Party Identification, the details of which are well know in the art and will not be discussed in further detail here. Thereafter, MSC 20 alerts handset 30 by generating a ringing signal.

In an ANSI-41 network, HLR 24 periodically receives and stores update information regarding the location of Handset 30 and assigned call parameters. This typically occurs whenever subscriber 30 "powers on" or enters a different wireless serving area and initiates the registration process. In operation, handset 30 detects the presence of a Base Station (BS) 28 or Base Station Controller (BSC) 26. BS 28 or BSC 26, in turn, alerts the serving MSC, here MSC 20, that the handset 30 has begun registration. MSC 20 thereafter sends a Registration Notification Message (REGNOT) to HLR 24 requesting call termination parameters for handset 30. HLR 24 then sends a Registration Notification Response message (regnot) to MSC 20. The Registration Notification Response message provides the above-referenced call termination parameters for subscriber 30 including whether the party has subscribed to certain call features such as Call Forwarding, Single Number Service™, etc. MSC 20 then stores this information for subsequent processing.

As those skilled in the art will recognize, changes in a subscriber's call feature set, i.e. the subscriber's Profile, will be updated at the serving MSC whenever the subscriber powers on or enters a wireless serving area and begins the registration process as indicated above. However, changes which occur at any other time outside of the registration process, may not be updated at the MSC. A typical situation occurs when a mobile subscriber who has already registered with a serving MSC, places a call to a customer support service to change his or her profile. By way of example, the subscriber may request that the call feature "Call Forwarding" be enabled or disabled. A customer support representative using an appropriate user interface such as a web-based interface, will make the change directly at the subscriber's HLR 24. Messaging between HLR 24 and the subscriber's serving MSC 20, however, called a "Qualification Directive" (QUALDIR), will typically not occur, however, unless the subscriber "re-registers" by turning his or her mobile phone off and then on. Absent such re-registration, or a preprogrammed location

request message on the part of MSC 20 as part of a periodic update function, a Qualification Directive will not be sent and MSC 20 will be unaware of the change in the subscriber's profile.

Consequently, a need has developed for an automated method for updating a serving MSC with a change in a subscriber's profile without requiring the subscriber to end the call with a customer support center and powercycle their handset.

DISCLOSURE OF INVENTION

It is a principal object of the present invention to provide an automated method for updating a serving MSC with a change in subscriber's profile.

In carrying out the above object, there is provided an automated method for updating an MSC which is specifically adapted for use in a communication system which includes a Home Location Register (HLR), a serving Mobile Switching Center (MSC), and a plurality of subscribers. The method includes receiving an update as a database in communication with the HLR regarding a change in a subscriber Profile. The method further comprises initiating a stored procedure in the database to generate a request to the HLR to send a Qualification Directive to the serving MSC for the subscriber. Finally, the method includes sending the Qualification Directive to the MSC.

These and other objects, features, and advantages of the present invention will become more readily apparent with reference to the following description of the drawings where like referenced numerals correspond to like components.

BRIEF DESCRIPTION OF DRAWINGS

FIGURE 1 is a schematic diagram of a prior art wireless network;

FIGURE 2 is a schematic diagram of the system of the present invention;

FIGURE 3 is a block diagram of the method steps of the present invention;

FIGURE 4 is a schematic diagram of the system of the present invention; and

FIGURE 5 is a flow diagram of the method of the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

The present invention utilizes the built-in capabilities of a database " stored procedure" to initiate a Qualification Directive (QUALDIR) command from a Home Location Register directly to a wireless subscriber's serving Mobile Switching Center following a change in the subscriber's profile at a database.

As those skilled in the art will recognize, a stored procedure is a program which runs in a database and can take complex actions based on the inputs the user sends it. Using a stored procedure is typically faster than doing the same work on a database client, because the program runs inside the database server. In the case of SQL statements, for example, a user may put a batch of such statements in a "procedure" stored in a Sybase server database. Stored procedures may include parameters designed as part of the stored procedure creation statement to allow the procedures to be used in a flexible fashion. Stored procedures are typically stored in a server in a precompiled format. In this manner, many users may invoke the same query with different parameters.

With reference to Figures 2 and 4 of the drawings, those skilled in the art will recognize that Home Location Register (HLR) 24 includes or is provided in communication with a database 25 which functions to store the Profile of each subscriber in a wireless communication system. This Profile includes the feature sets to which the subscriber has subscribed to such as, for example, Call Forwarding,

Voice Mail, etc. Database 25 is, in turn, provided in communication with a Service Center 27 via a database client connection. Database 25 is further provided in communication with an operating system 29 via a database operating system communication 31 such as, for example, Solaris version 7.0 or 8.0 or IBM AIX, HP UX, or Windows NT etc. Finally, HLR 24 is provided in communication with operating system 29 via an HLR communication 33. In the preferred embodiment, database 25 is a Sybase release 11.5 or later, which uses an XP CMDSHELL command to initiate the above-referenced Qualification Directive (QUALDIR) IS-4 message. Sybase transact-SQL commands are an example of an update to the database, which then requires the sending of a QUALDIR message to the switch that is facilitated by the present invention. Other databases and corresponding commands are, of course, understood to be within the scope of the present invention including, but not limited to, Oracle, Informix, etc.

As indicated above, prior to the present invention, the Qualification Directive, i.e. an update message from HLR 26 to a serving MSC 30 generally occurs only upon receipt of a request from MSC in response to registration of a subscriber. In keeping with the invention, any change to database 28 will initiate a stored procedure which generates a request to HLR 26 to automatically send a Qualification Directive (QUALDIR) to the serving MSC 30 with the corresponding change for a given subscriber.

Fig. 3 of the drawings provides a more detailed review of the method steps of the present invention. As shown therein, the method comprises receiving 32 an update at a database regarding a change in a Profile for a subscriber having a given Directory Number (DN) or Mobile Identification Number (MIN). The method further comprises initiating 34 a stored procedure in a database to generate a request to the HLR to send a Qualification Directive to the serving MSC for the subscriber. As indicated above, the Qualification Directive includes an update to the subscriber's profile. Finally, the method comprises sending 36 the Qualification Directive to the serving MSC.

Figure 5 of the drawings illustrates an exemplary invocation via an HTTP (web) client. As shown, a computer running a web browser initiates a request 40 to change service for a Mobile Identification Number (MIN) for a subscriber 42. The MIN is included in the request along with parameters that need to be changed. This request is sent to the Web Server 44. Upon receipt, Web Server 44 communicates 48 directly with the database on the HLR 46. This communication can be any one of several ways including, but not limited to, Sybase Open Client for Sybase, SQL*NET for Oracle, JDBC for Java, or any other database specific protocol. Web Server 44 thereafter requests that a stored procedure within HLR 46 be executed. In keeping with the invention, the stored procedure updates data in the HLR 46 database with the data sent to it from the web server 44 and then initiates a request, through the operating system, to initiate a QUALDIR 50. The HLR46 thereafter sends the QUALDIR to the serving Mobile Switching Center (MSC) 52. MSC 52 then returns a qualdir return request 54 to the HLR 46. The HLR DB stored procedure completes processing and sends back the result 56 to the web server 44. Finally, the web server 44 formats the response into appropriate HTML 58 and sends a web page to the browser to indicate the outcome of the procedure.

While embodiments of the invention have been illustrated and described, it is not intended that these embodiments illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the invention.

WHAT IS CLAIMED IS:

1. For use in a wireless communication system including a Service Location Register, a Switching Center, and a subscriber, a method of automatically updating the Switching Center with a change in the subscriber's profile, comprising:

receiving an update at a database regarding a change in the subscriber's profile;

initiating a stored procedure in the database to generate a request to the Service Location Register to send a profile update to the Switching Center for the subscriber; and

sending the profile update to the Switching Center.

2. A method as in Claim 1, wherein the Service Location Register is a Home Location Register (HLR).

3. A method as in Claim 1, wherein the Service Location Register is a Wireless Service Location Register (WSLR).

4. A method as in Claim 1, wherein the Switching Center is a Mobile Switching Center (MSC).

5. For use in a wireless communication system including a Home Location Register (HLR), a Mobile Switching Center (MSC), and a plurality of subscribers, a method of automatically updating the MSC with a change in the subscriber profile, comprising:

receiving an update at a database regarding a change in the subscriber profile;

initiating a stored procedure in a database to generate a request to the HLR to send a qualification directive to the MSC for the subscriber; and

sending the Qualification Directive to the MSC.

6. For use in a wireless communication system including a Service Location Register, a Switching Center, and a subscriber, a system for automatically updating the Switching Center with a change in the subscriber's profile, comprising:

a database in communication with the Service Location Register, the database operative to receive an update regarding a change in the subscriber's profile and initiate a stored procedure to generate a request to the Service Location Register to send a profile update to the Switching Center.

7. A system as in claim 6, wherein the Service Location Register is a Wireless Service Location Register.

8. A system as in claim 6, wherein the Switching Center is a Mobile Switching Center (MSC).

9. A system as in claim 6, wherein the database is a Sybase database.

10. A system as in claim 6, wherein the request generated by the database is a Qualification Directive.

ABSTRACT OF THE DISCLOSURE

A method and system for automatically updating a serving MSC with a change in a subscriber profile includes receiving an update at a database regarding a change in a subscriber's profile. A stored procedure is initiated at the database to generate a request to the Service Location Register to send a profile update to the switching center for the subscriber.

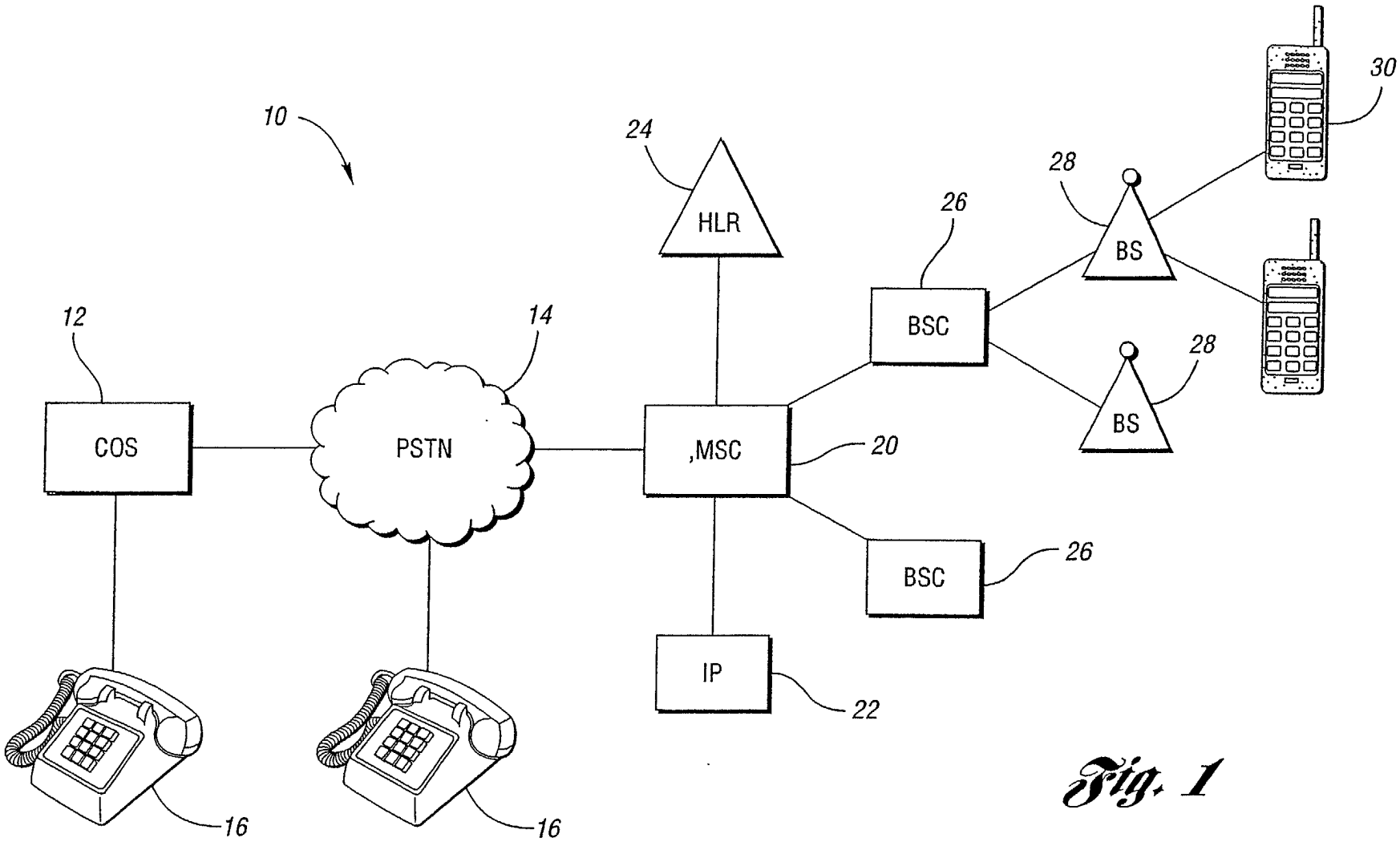

Fig. 1

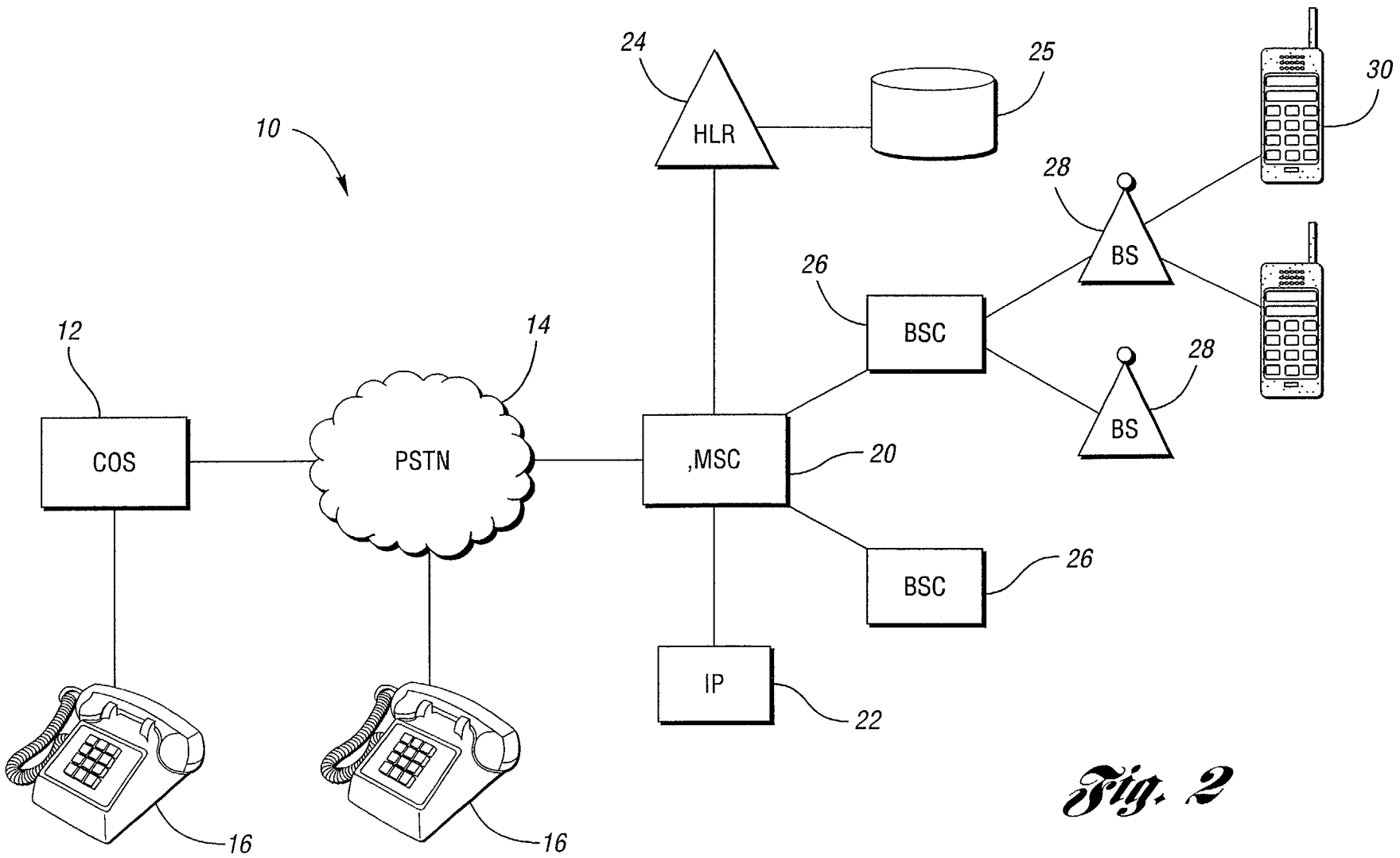

Fig. 2

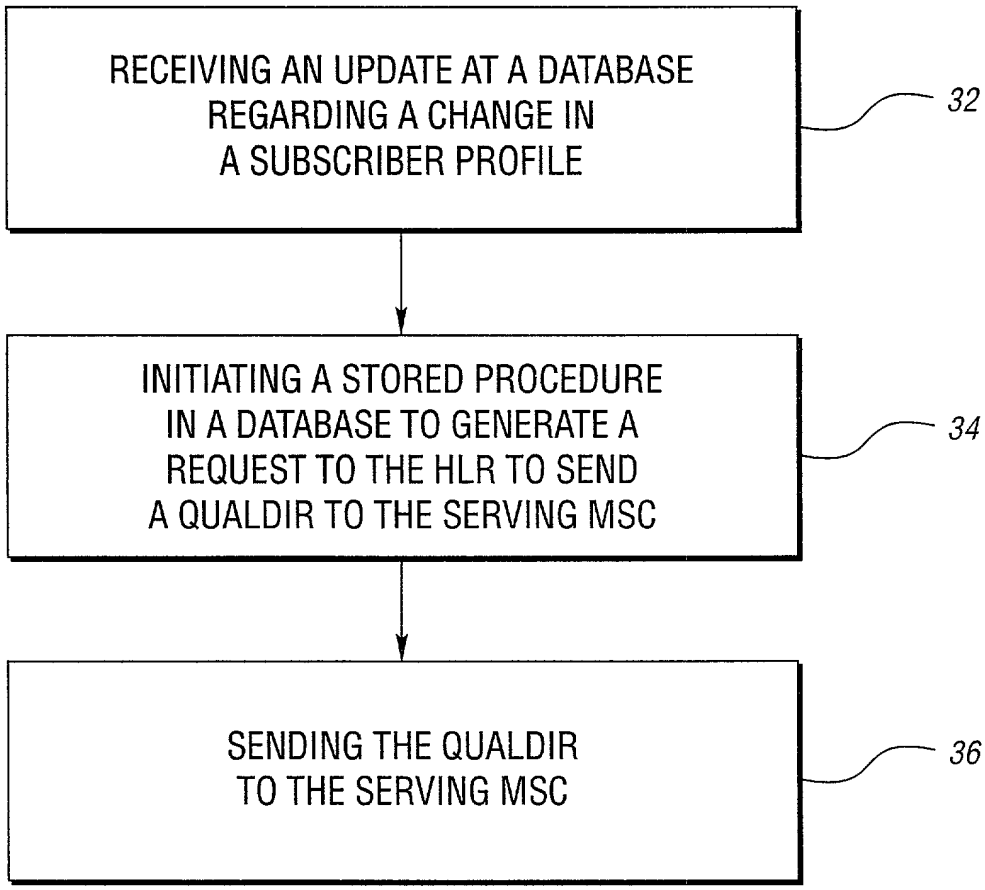
RECEIVING AN UPDATE AT A DATABASE REGARDING A CHANGE IN A SUBSCRIBER PROFILE
32
INITIATING A STORED PROCEDURE IN A DATABASE TO GENERATE A REQUEST TO THE HLR TO SEND A QUALDIR TO THE SERVING MSC
34
SENDING THE QUALDIR TO THE SERVING MSC
36

Fig. 3

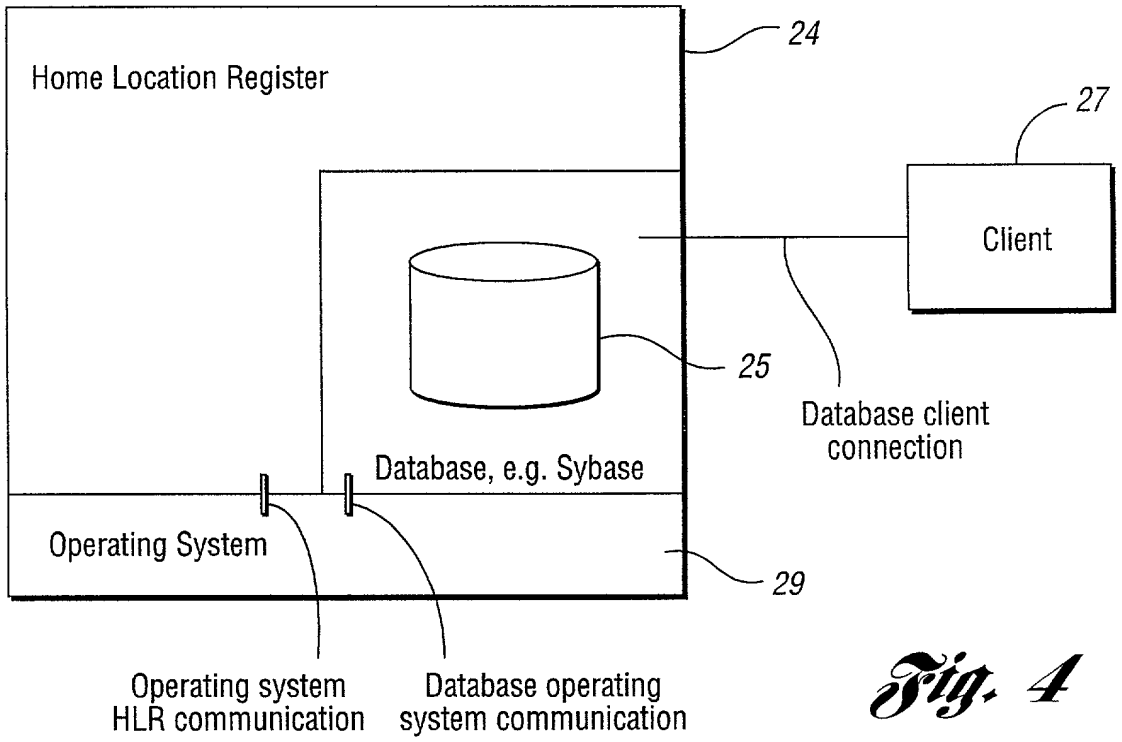
Home Location Register
24
27
Client
25
Database client connection
Database, e.g. Sybase
Operating System
29
Operating system HLR communication
Database operating system communication

Fig. 4

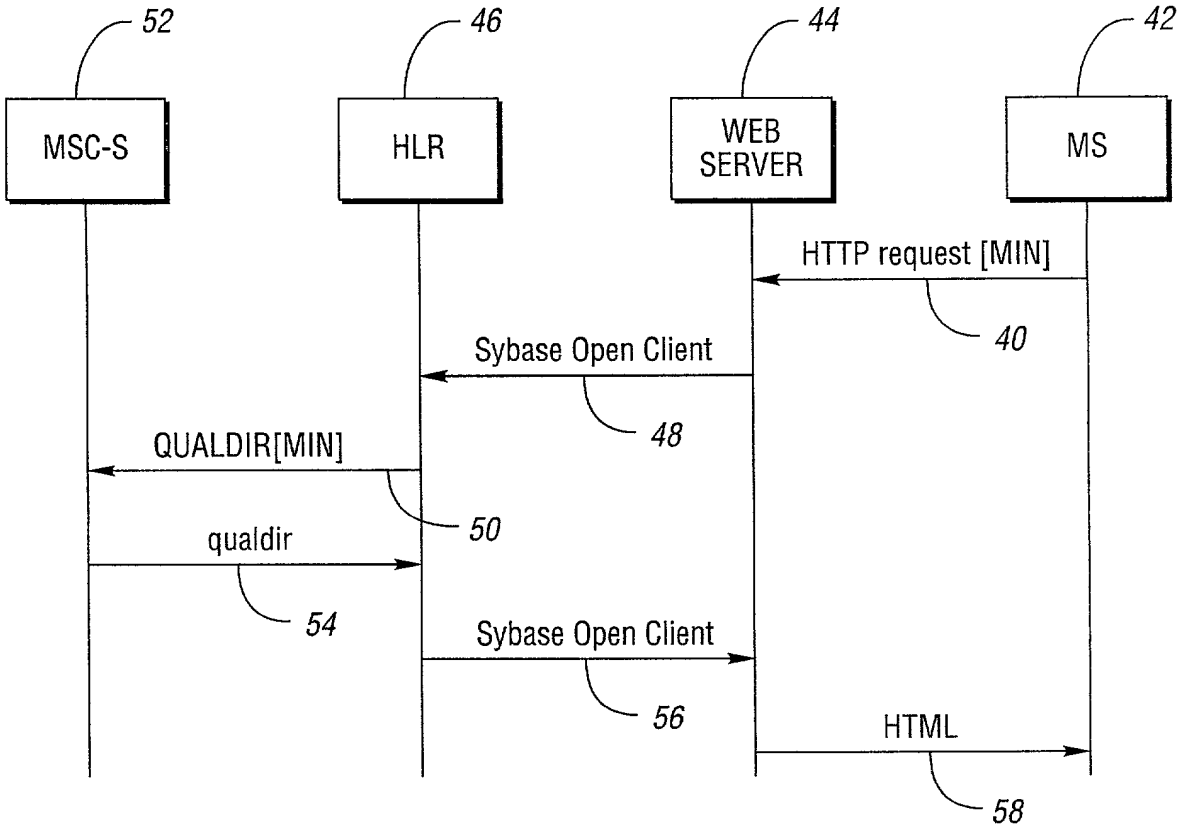
52
46
44
42
MSC-S
HLR
WEB SERVER
MS
HTTP request [MIN]
40
Sybase Open Client
48
QUALDIR[MIN]
50
qualdir
54
Sybase Open Client
56
HTML
58

Fig. 5

DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

Atty. Docket No. 1720/USW 1720 PUS
First Named Inventor Lester B. Shupe et al.

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

A METHOD AND SYSTEM FOR A SECURED INTELLIGENT PARTITIONED COMMUNICATION SYSTEM ,

the specification of which:

[x] is attached hereto; or
[ ] was filed on (MM/DD/YYYY) _____ as U.S. Application Number or PCT International Application Number _____, and was amended on (MM/DD/YYYY) _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below, and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	*Country*	*Foreign Priority Date (MM/DD/YYYY)*	*Priority Not Claimed*	*Certified Copy Attached? (Yes/No)*

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

Application Number(s)	*Filing Date (MM/DD/YYYY)*

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

Application Number(s)	*Filing Date (MM/DD/YYYY)*	*Status: Patented, Pending, Abandoned*

Declaration for Patent Application (cont'd.) Atty. Docket No. 1720/USW1720PUS

I hereby appoint the practitioners associated with Customer Number 22193 to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and direct that all correspondence be addressed to that Customer Number. Telephone calls should be directed to U S WEST, Inc., Law Department--Intellectual Property Group, at (877) 879-4747 or (303) 672-2700.

22193

PATENT TRADEMARK OFFICE

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Sole or First Inventor Lester B. Shupe

Inventor's signature _____ Date 8/15/00

Post Office Address 11392 Eaton Way, Broomfield, CO 80020

Residence (same as above) Citizenship U.S.A.

Full Name of Second Joint Inventor David R. Clark

Inventor's signature _____ Date 8/15/2000

Post Office Address 2329 Eaglview Circle, Longmont, CO 80504

Residence (same as above) Citizenship U.S.A.

Full Name of Third Joint Inventor _____

Inventor's signature _____ Date _____

Post Office Address _____

Residence _____ Citizenship _____

Full Name of Fourth Joint Inventor _____

Inventor's signature _____ Date _____

Post Office Address _____

Residence _____ Citizenship _____